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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/960,086	09/20/2001	Rajiv Doshi	19441-0034	5046

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EXAMINER
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WALKER, KEITH D

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 08/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/960,086

Applicant(s)

DOSHI ET AL.

Examiner

Keith Walker

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 31 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-37 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-37 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 1 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The limitation of the partially reacted fuel fluid and oxidant fluid exchanging heat "without reacting" does not seem to be supported and therefore is seen as new matter.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-5, 9, and 28-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Grumble, US Patent 4,729,931

Art Unit: 1745

Grimble discloses a fuel cell system, which includes:

a fuel cell stack having a manifold wherein heat is exchanged between a fuel fluid and an oxidant fluid. Oxidant and fuel exchange heat through (5). The manifold is internal to the fuel cell and thus an internal manifold. A recuperator wherein heat is exchanged between an exhaust gas from said fuel cell stack and said oxidant fluid. Note that the oxidant input and the gas exhaust exchange heat through the upper portion of wall (6). A thermal enclosure surrounding said fuel cell stack, said manifold, and said recuperator.

With regards to claims 2 and 3, the chamber containing catalytic packing (20) serves as combustion chamber, which preheats fuel by catalytic partial oxidation. (Column 2, lines 47-55.) With regards to claim 5, the nozzle (18) forms a jet stream from the fuel, and thus vaporizes the fuel. (Column 2, lines 47-49.)

With regards to claims 28-31, the fuel cell is operated by combusting the exhaust gas (13) using the catalytic stack (20) to reform fuel and using the nozzle (18) to vaporize fuel.

Claims 11-16, 20, and 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Schuler, US Patent 6,303,243. As shown in Figs. 1 and 2 of the Schuler reference, the fuel cell system disclosed by Schuler comprises a first interior cavity (25) and a second interior cavity (3). The system has flow orifices (56), (60) and (81). As shown in Fig. 2, the oxidant and gas flows are separated by the electrochemically active plate (21) and heat is exchanged between the fluid flows by means of interconnector (22). The interconnector is designed as a heat exchanger. (See column 2, lines 46-48.)

Art Unit: 1745

The horizontal faces of interconnect (22) serve as separator plates, and define first and second channels, (82) and (57). With regards to claim 12, the feed tube (81') is disposed in second cavity (3) and ultimately provides fluid communication between the first interior cavity and the first flow orifice, since the fuel and oxidant streams eventually merge within channel (60). With regards to claims 13 and 14, the multiple arrows within (6) and (25) of Figure 1 indicate porous flow distributors. With regards to claims 15 and 16, Figure 2 shows the interconnecting portion of (22), i.e. the vertical portion of the piece, is between the separator plate portion and the anode and cathode layers of plate (21). With regards to claim 20, the fuel cells are described by Schuler as planar and in a centrally symmetrical stack, and thus are in a planar and annular configuration. (See abstract.)

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6, 10, 27, and 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grimble in view of Barton et al., US 2003/0022050 A1.

Art Unit: 1745

As discussed above, Grimble discloses applicants' invention essentially as claimed, with the exception that Grimble does not disclose air flow delivery, which pressurizes the oxidant and provides pressurization for the fuel, a pressure relief valve, or an air compressor for delivering an air flow. Barton et al. disclose fluid supply systems for fuel cells, which include pressurized fluid and pressure relief valves for the purpose of controlling fluid flow in the fuel cell. (See Barton et al., paragraphs 49, 51 and 54.) Therefore, it would have been obvious to one of ordinary skill in the art to use the pressurization and pressure control systems disclosed by Barton et al. in the fuel cell system disclosed by Grimble in order to control oxidant and fuel flows in the Grimble fuel cell system. With regards to claim 32, Barton et al. disclose obtaining fuel from a fuel tank. (paragraph 51).

Claims 7, 8, 36, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grimble in view of Morrow, Jr. et al., US Patent 4,087,076. As discussed above, Grimble discloses applicants' invention essentially as claimed, with the exception that Grimble does not disclose thermal enclosures which are vacuum vessels or which include multi-layer insulations, which includes metal foil and porous ceramic. Morrow et al. disclose the most effective insulation for high temperature electrolytic devices consists of multi-layer radiation shields in a vacuum, and teaches a molybdenum-zirconia cloth will provide multi-layer vacuum insulation. (See Morrow et al., column 7, lines 37-47.) Therefore, it would have been obvious to one of ordinary skill in the art to use a vacuum-multilayer insulation in the invention of Grimble because Morrow et al. teach this is an effective insulation for a fuel cell system.

Art Unit: 1745

Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schuler.

Schuler discloses applicants' invention essentially as claimed, with the exception that Schuler does not specifically mention the use of solid oxide fuel cells or polymer membrane fuel cells with his invention. However, Schuler mentions "high temperature" fuel cells. Since both solid oxide fuel cells and polymer electrolyte fuel cells operate at temperatures above ambient, one of ordinary skill in the art would recognize temperature control issues with fuel cells would apply to both types of fuel cells, and the use of the Schuler invention with both solid oxide and polymer electrolyte fuel cells would have been obvious to one of ordinary skill in the art

Claims 17-19, and 22-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schuler, in view of Piascik et al., US Patent 6,291,089.

With regards to claim 17, Schuler discloses applicants' invention essentially as claimed, with the exception that Schuler does not disclose endplates for the fuel cell stack. The use of endplates to collect electric current from a fuel cell is well known in the art, as evidenced by Piascik et al., column 6, lines 1-2. Therefore, it would have been obvious to one of ordinary skill in the art to include endplates in the invention of Schuler in order to easily collect electric current.

With regards to claims 22 to 27 Schuler does not specifically disclose the mechanical configurations of interconnects claimed by the applicants. Piascik et al. teach fuel cell interconnects made in offset fin shapes or of nickel foam. (Column 6, lines 45-52.) These shapes and materials are taught as having the advantage of

Art Unit: 1745

preventing damaging thermal stresses in the fuel cells. Therefore, it would have been obvious to one of ordinary skill in the art to use nickel foam or offset fins in the separators disclosed by Schuler in order to minimize thermal stress in the fuel cell.

***Response to Amendment***

With respect to claim 1, arguments will be addressed if the new matter rejection as stated above is overcome.

Applicant's argument regarding claims 1, 3-5, 9 & 28-31 fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references. The arguments of better performance and the objectives sought do not distinguish from the prior art of record and therefore the limitations of the claims are anticipated/obvious over the prior art.

Applicant's arguments, with respect to the rejection(s) of claim(s) 11-19 & 20-27 under Schuler and Schuler in view of Piascik have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Schuler. Applicant argues the tube (81') does not receive fluid from the previously stated second chamber (6), but only runs through chamber (6). While this argument is found persuasive, the outer chamber (3) does meet the limitation of a second fluid delivered through the second flow orifice from the second interior cavity as stated in the claims and the new rejections are listed above.



Art Unit: 1745

Regarding claims 6, 10, 27 & 32-35, applicant traverses the rejections based on previous reasons of claims 1 & 10. Response to the arguments for claims 1 & 10 are found above. Concerning the storage tank not in fluid communication with a fuel vaporizer, the fuel supply tube vaporizes the fuel. It would have been obvious to one skilled in the art to hook the fuel storage tank taught by Barton to the fuel cell supply line of Grimbale.

In response to applicant's argument that the reference combination of Grimbale in view of Morrow would not be operable, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keith Walker whose telephone number is 571-272-3458. The examiner can normally be reached on Mon. - Fri. 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1745

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KW

  
**PATRICK JOSEPH RYAN**  
**SUPERVISORY PATENT EXAMINER**